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posed fluid suspected to contain the poisonous metal; in which case, as was formerly shown by Sir H. Davy in his Bakerian lecture, the metal held in solution is deposited in the form of crystals, on the negative surface. The zinc was usually employed in the form of foil; the platina was, in some cases, a small crucible, or a spatula; but more frequently platina foil was used. It is generally necessary to mix a few drops of acid with the metallic compounds that are subjected to this test, and that are placed in contact with the platina: on applying the zinc foil, the platina will soon become coated with the reduced metal.

The author then enters into the detail of his experiments on the efficacy of his method in the detection of arsenic, mercury, lead and copper, in their different states of oxidation and saline combinations; and of the precautions necessary to be observed in the case of each metal. He was enabled to detect the presence of arsenic, by the exhibition of its characteristic properties, when only the 500th part of a grain of that metal was deposited on the platina; and in some instances could appreciate the 2500th part of a grain, by the application of appropriate tests.

The author next ascertained that the electro-chemical method is competent to the detection of very minute quantities of the different metals, when their compounds are mixed with various vegetable and animal substances. Thus, the presence of arsenic would readily be discovered when mixed with all the ordinary articles of diet,—such as wheaten flour, bread, starch, rice, potatoes, peas, soup, sugar, vinegar, gruel, tea, milk, eggs, gelatine, and various kinds of wine; also when mixed with the principal secretions of the alimentary canal, as bile and saliva. Arsenious acid mixed with butter, lard and oils, or with sheep's blood, or ox bile, was detected with great ease. Similar results were afforded by corrosive sublimate, the acetate of lead, and sulphate of copper, added in small quantity to the most complicated mixtures of organic substances. In some instances where the common tests do not act at all, or only act fallaciously, the electro-chemical method acts with the greatest certainty.

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*Anniversary Meeting, Nov. 30th.*

DAVIES GILBERT, Esq. President, in the Chair.

On this occasion the President delivered the following Address:

Gentlemen,

Having now, for the last time, to address you in reference to the loss of eminent persons sustained by the Society in the preceding year, I cannot but congratulate you on the difference between the list now read, and that which we had the misfortune to hear twelve months ago. Several individuals of great distinction, of extensive acquirements and of splendid talents, are undoubtedly brought before us on the present occasion: but advanced age or long absence from

this metropolis tend in some instances to lessen the pain we should otherwise feel on the recital of their names. While in the former case, persons at the very head of different departments in science, of our own ages, and daily conversant with our social habits, were suddenly taken from us, leaving the higher paths of science (as we feared at the time) without a foot that might in future trace their windings; and our more familiar society without that sparkling of intellect, which invigorates the understanding, and at once elevates and refines the common intercourses of life.

The individual, who unquestionably demands our first attention is Major James Rennell, taken from us in his eighty-eighth year, lamented by all those who are capable of appreciating his science, and by every one conversant with his active virtues or with the simplicity and kindness of his manners.

I have endeavoured to collect some particulars respecting this distinguished person in his early years.

Major Rennell was descended from an ancient and respectable family in Devonshire, said to be of Norman origin. His father was a Captain in the Royal Artillery, and fell at the siege of Maestrich. James Rennell was born at his father's house, Upcott near Chudleigh, in Devonshire, on the 23rd of December, 1742. He entered on the naval service of his country at a very early age, where his spirit and exertions soon attracted the notice of Sir Hyde Parker, with whom he sailed in the Brilliant frigate to India. After the conclusion of peace, his eager desire for active service induced him to quit the navy, and he obtained a commission in the corps of engineers belonging to the East India Company. His zeal and ability in discharging the duties belonging to this station obtained for him the friendship of many superior officers, and especially of the great Lord Clive; and he was soon promoted to the station of Surveyor General in Bengal.

The fatigues attached to this civil employment were sufficient to exhaust the strength of any European constitution, conducted as were the surveys, with indefatigable industry, along the banks of the great rivers, periodically overflowed and perpetually damp. But these were not all: Major Rennell in encountering dangers which are inseparable from military renown, had suffered wounds so severe that he was, I believe, twice left exposed on the field of battle, and never recovered from their effects up to the latest period of his life. These altogether compelled his return to England, and alone prevented him from attaining the highest military stations.

Retired to private life, the whole energies of his mind were directed to scientific and literary pursuits. We have, founded on his exertions in India; *An Atlas of Bengal.—A Map of the Mogul Empire.—Marches of the Army in India.—A Map of the Peninsula.*

But the mental powers of Major Rennell were far from being confined to one region of the world.

We have from his pen a work on the Geography of Africa. And with a vigour of intellect that may well call to our recollection the greatest of the Roman Censors, he acquired at an advanced age a competent

knowledge of Greek for consulting the early writers in that language, and gave to the world, *The Geographical System of Herodotus*, including the Expedition of Darius Hystaspes to Scythia; *The Site of Babylon*; *The Temple of Jupiter Ammon*; *The Periplus of Africa*, &c.; and *A Dissertation on the Locality of Troy*.

The attention of this great investigator of everything connected with the surface of our globe, extended itself from mountains and plains to the waters of the ocean; and produced a most curious investigation of the currents prevalent in the Atlantic, and of accumulations caused by certain winds in the English Channel.

And lastly, I would mention a very ingenious mode of ascertaining distances, and connecting with their bearings the actual localities of spots in the Great Desert, by noting the average rate at which camels travel over those worlds of sand.

This is a very imperfect catalogue of the works published by Major Rennell; and I am happy to add that several more exist in manuscript, destined, we may hope, at no distant time, to appear.

Major Rennell has been honoured by the Copley Medal from this Society; by the Gold Medal from the Royal Society of Literature; he was a Corresponding Member of the Institute of France; and a Member of various other Societies.

Our regret for such a man, exerting his intellectual powers with so much energy and to such useful purposes, throughout the course of a long life, and up to his eighty-eighth year, must always be strong and sincere; but we console ourselves with the reflection that he had attained the utmost ordinary limit of human life, amidst the respect and esteem of all who knew him, and that his memory is revered.

Mr. Chenevix was undoubtedly a man of considerable ability, acquirement and industry. We have from him seven different communications to the *Philosophical Transactions*:

An analysis of the arseniates of copper.—Observations on Dr. James's powders, with a method of preparing a similar substance in the humid way.—Observations and experiments upon oxygenated and hyperoxygenated muriatic acid.—An analysis of corundum.—Observations on the chemical nature of the humours of the eye.—Inquiries concerning the nature of a metallic substance, under the title of Palladium.—On the action of platinum and mercury on each other.

In the latter years of his life, which could not have reached three-score, he appears to have abandoned chemistry, and to have fallen on speculations wholly unworthy of being noticed from this place.

The only remaining individual who has taken a direct active part in our labours, by contributing to the *Transactions*, is Mr. James Lewis Smithson, and of this gentleman I must be allowed to speak with affection. We were at Oxford together, of the same College, and our acquaintance continued to the time of his decease.

Mr. Smithson, then called Macie, and an undergraduate, had the reputation of excelling all other resident members of the University in the knowledge of chemistry. He was early honoured by an intimate acquaintance with Mr. Cavendish; he was admitted into the Royal

Society, and soon after presented a paper on the very curious concretion frequently found in the hollow of bambû canes, named *Tabasheer*. This he found to consist almost entirely of silex, existing in a manner similar to what Davy long afterwards discovered in the epidermis of reeds and grasses.

Mr. Smithson enriched our Transactions with seven other communications:—A chemical analysis of some calamines.—Account of a discovery of native minium.—On the composition and crystallization of certain sulphurets from Huel Boys in Cornwall.—On the composition of zeolite.—On a substance procured from the elm-tree, called *Ulmine*.—On a saline substance from Mount Vesuvius.—Facts relative to the colouring matter of vegetables.

He was the friend of Dr. Wollaston, and at the same time his rival in the manipulation and analysis of small quantities. *Αγαθὴ δ' ἐρεῖς ἤδε βροτοισιν*. Mr. Smithson frequently repeated an occurrence with much pleasure and exultation, as exceeding anything that could be brought into competition with it,—and this must apologize for my introducing what might otherwise be deemed an anecdote too light and trifling on such an occasion as the present.

Mr. Smithson declared, that happening to observe a tear gliding down a lady's cheek, he endeavoured to catch it on a crystal vessel: that one-half of the drop escaped, but having preserved the other half, he submitted it to reagents, and detected what was then called microcosmic salt, with muriate of soda; and, I think, three or four more saline substances, held in solution.

For many years past Mr. Smithson has resided abroad, principally, I believe, on account of his health: but he carried with him the esteem and regard of various private friends, and of a still larger number of persons who appreciated and admired his acquirements.

Of gentlemen who have not taken a direct share in the labours of this Society, I would notice Mr. Henry Browne.

No one, I believe, was ever more distinguished in the important station of commanding those vessels which secure to England the commerce of nations unknown to former ages; nor did any one more largely contribute towards introducing the modern refinements of nautical astronomy, which skilfully pursued, and under favourable circumstances, determine the place of a ship with greater accuracy, than what in the early part of the last century would have been thought amply sufficient for headlands, roadsteads, or harbours of the first importance. And I cannot omit this opportunity of congratulating all those who addict themselves to astronomical pursuits, or who feel an interest in the perfection of geography and navigation, on the great improvements recently suggested and likely to be made in our national ephemeris; improvements which, in part at least, I hoped to have got adopted twelve years ago: but now under more fortunate auspices I flatter myself that they will be carried into execution, and their practical advantages cannot fail of being very great.

Retired to private life, Mr. Browne usefully amused his declining years by a continuance of his favourite pursuits; and up to the latest

period of his life he patronised, encouraged, and promoted practical astronomy.

Lieutenant-Colonel Mackenzie has, I understand, cultivated science in the East, but no particulars have come to my knowledge.

Sir Lucas Pepys is well known to have attained considerable eminence in his profession.

The Rev. Stephen Weston will long be remembered for his learning, abilities, good-nature, and for his eccentric compositions on various subjects, and in different languages. And for one at least, I may truly say, that it would gratify me to find a more permanent reputation secured for this excellent man, by a collection being given to the public of his numerous *Opuscula*.

The late Duke of Atholl demands also attention, not on account of his high station, but as a patron of science, and especially of that most important, interesting and rapidly improving branch of science, Geology.

Geology, deriving its birth from the continent of Europe, seems to have been drawn to this island by the genius of Dr. Hutton, and here to have grown with the vigour of youth under the fostering hands of many who now hear me, and also of a gentleman to whom the Duke of Atholl afforded every assistance to be derived from his large property, and his extensive influence.

The Duke of Atholl has also at once enriched and decorated his country; and afforded an instructive example to all other proprietors of similar wastes, by clothing tracts of land, incapable of a different cultivation, with the most valuable of the pines. His forests of larch, which have acquired maturity in the course of a single life, promise not merely to supersede the use of foreign deal, but to allow of our reserving the tree always esteemed the peculiar pride and boast of this island, for the construction of ships of war on the largest scale.

Another individual remains, whom no technicality in regard to pursuits can prevent our noticing with honour, on this occasion: whose very deportment indicated the elegance of his mind; and the justness of whose remarks on everything connected with art, gave assurance of the perfection invariably found to exist in all subjects created by the touch of his magic pencil.

Sir Thomas Lawrence stands proudly preeminent among native artists, and perhaps among artists of the whole world, in that department to which he exclusively applied the powers of his genius: nor would, I am persuaded, the great painter of the preceding age have been unwilling to admit him as his equal in the delineation of portraits—not the servile copies of individual features, but poetic likenesses, where every excellence is heightened, where the mind is depicted, and where the particular person seems to embody the class of virtues, of intellectual powers, or of amiable qualities, designating the moral order in which he is arranged.

This constitutes unquestionably a department of historical painting not inferior, perhaps, nor even less difficult of acquirement than the others, where all is imaginary.

The name of Reynolds must, and, for various reasons, ever will stand first on the list of those who have cultivated in this country the whole extent of an art, the most refined, requiring talents the most rare, and at the same time the most delightful of all that have sprung from the human mind ;—but that of Lawrence will be hailed by the Academy as their *Spes altera*, and their *Decus gemellum*.

I am not aware of the loss of any Fellow of the Society on our Foreign List.

Gentlemen,

Your Council for the past year have awarded one of the Royal Medals to Dr. Brewster, for his various communications on Light, printed in the last volume of your Transactions.

Unable as we are to investigate the real essences of physical bodies, it is impossible nicely to discriminate their relative importance by observing the external or accidental properties they may assume : but light is so preeminent in all its relations ; as the cause of vision ; in the rapidity of its flight, or of its vibration ; in its connexion with heat ; in its adorning everything in nature by a secondary quality ;—that no more could be wanting to secure its place at the head of that class of transcendent or imponderable substances, which appear to animate the material world.

Other properties have, however, been recently discovered, not less wonderful than those that were previously known, and which promise to decide the long-agitated question between corpuscular projection and the vibration of a fluid at once inconceivably elastic and rare.

In all these discoveries Dr. Brewster has taken an ample share. And as a public testimony of the sense entertained by the Royal Society of their importance, and of his ability and exertions, I have the honour of presenting to him the Royal Medal.

The discovery of any new elementary substance has ever been deemed an occurrence worthy of being marked by some public declaration of applause.

The ascertaining chlorine to be, in the actual state of our knowledge, one of this class, has justly been considered as among the most brilliant of Sir Humphry Davy's achievements in chemical science. Iodine has been added to the supporters of combustion, occupying, like oxygen and chlorine, the negative extremity of the scale in electro-chemistry.

More recently another substance, apparently intermediate between chlorine and iodine, has been derived from the same source as that yielding the latter,—from the water of the sea ; and from its peculiar odour denominated brome, and subsequently bromine. An ample account of the properties distinguishing the substance may be found in a memoir by the discoverer, Mons. Balard of Montpellier, read before the Academy of Sciences, published in the *Annales de Chimie*, vol. xxxii. p. 337, and abridged in the twenty-second volume of the Quarterly Journal of Science, p. 384.

It will be seen by referring to the Second Part of our Transactions for the present year, that Dr. Daubeny has detected bromine in

various springs ; and it appears that the action of this substance, on the living system, unites with its chemical qualities in associating it with iodine. So marked and so decisive indeed are its effects, that various medical waters are conjectured to owe their beneficial qualities to the presence, in extremely minute portions, of this elementary body, unknown and unsuspected previously to the researches of M. Balard.

To him, therefore, I am directed by your Council to deliver the other Royal Medal, in testimony of the high respect entertained for his ability, industry, and skill displayed in the discovery of bromine.

The Copley and the Rumford Medals have not been awarded.

The Society next proceeded to the election of the Council and Officers for the ensuing year, when the following were declared to be the lists:—

*Council.*—Peter Barlow, Esq. ; John Barrow, Esq. ; William Cavendish, Esq. ; Sir Astley Cooper, Bart. ; Henry Ellis, Esq. ; Michael Faraday, Esq. ; Colonel Fitzclarence ; Davies Gilbert, Esq. ; Captain Henry Kater ; Viscount Melville ; Sir George Murray, Bart. ; Rev. George Peacock ; Sir Robert Peel, Bart. ; A. Wilson Philip, M.D. ; John Pond, Esq. ; George Rennie, Esq. ; N. Aylward Vigors, Esq.

*President :* His Royal Highness the Duke of Sussex, K.G.—*Treasurer :* John William Lubbock, Esq.—*Secretaries :* Peter Mark Roget, M.D., and John George Children, Esq.

December 9.

His Royal Highness the Duke of SUSSEX, President, in the Chair.

Henry Percy Gordon, Esq., M.A., and the Rev. John Warren, were elected Fellows.

The following Presents were received, and thanks ordered for them:—

Astronomical Observations made at the Armagh Observatory. By T. R. Robinson, D.D. Vol. I. Part II. 4to.—*Presented by the Rev. Dr. Robinson.*

The Philosophical Magazine and Annals of Philosophy. By R. Taylor, F.L.S. and R. Phillips, F.R.S. No. 48. (Dec. 1830.) 8vo.—*The Editors.*

The Edinburgh Journal of Natural and Geographical Science. New Series. No. 1. (Dec. 1830.) 8vo.—*The Editor.*

Fraser's Magazine for Town and Country. No. 10. (Nov. 1830.)—*The Proprietor.*

The National Portrait Gallery of Illustrious and Eminent Personages of the Nineteenth Century. By Wm. Jerdan, Esq. No. 20. 8vo.—*The Proprietors.*

The British Imperial Calendar for the Year 1831. 8vo.—*John Frost, Esq.*